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| 10/828,273 | 04/21/2004 | Kazuya Tajiri | 040302-0394 | 5449 |

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| EXAMINER |
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WILLIAMS, SHERMAN D L

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| ART UNIT | PAPER NUMBER |
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1745

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 03/21/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/828,273

Applicant(s)

TAJIRI ET AL.

Examiner

Shermanda L. Williams

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 4/21/04, 9/30/04
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statements (IDS) submitted on 9/30/04 and 4/21/04 have been placed in the application file, and the examiner has considered the information referred to therein.

Claim Objections

2. Claims 1 and 16 are objected to because of the following informalities:
3. It is suggested for the applicant to change "trough" to -through-. Appropriate correction is required.

Specification

4. The disclosure is objected to because of the following informalities:

For various places throughout the specification where "trough" appears, it is suggested for the applicant to change "trough" to -through-. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

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art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The applicant has not provide sufficient guidance for the following:

- a. How the pressure loss control mechanism controls the pressure in either the supply or the exhaust gas manifold in correspondence to the flow rate of the reaction gases in a way to establish a predetermined ratio between the pressure loss of either manifolds and the pressure loss of the flow passage;
- b. How a reduction ratio is set for the area of at least one of the supply or the exhaust gas ports as a result of movement of the movable member of the pressure control mechanism having dependence from each fuel cell;
- c. How the distance between the movable member of the pressure control mechanism and at least one of the supply or the exhaust ports is set depending of each fuel cell.

8. In MPEP 2164 and 2164.01 states "...when claimed subject matter is only presented in the claims and not in the specification portion of the application, the specification should be objected to for lacking the requisite support for the claimed subject matter... it has been interpreted to require that the claimed invention be enabled

so that any person skilled in the art can make and use the invention without undue experimentation. In re Wands, 858 F.2d at 737, 8 USPQ2d at 1404 (Fed. Cir. 1988)."

9. Factors to be considered in determining whether the claimed invention would require undue experimentation are given in MPEP 2164.01(a). In re Wands, 858 F. 2d 731, 737; 8 USPQ 2d 1400, 1404 (Fed. Cir. 1988). Only the relevant factors will be addressed herein for determining undue experimentation of the presently claimed invention. The relevant factors are (A) Breadth of the claims; (B) The state of the prior art; and (C) The amount of direction provided by the inventor.

10. *Factor (A) Breadth of the claims:*

No guidance is given in the specification for relating the pressure loss in either the supply or the exhaust gas manifold gases in correspondence to the flow rate of the reaction gases in a way to establish a predetermined ratio. It is unclear how the pressure loss in either the supply or the exhaust gas manifold and the pressure loss of the reaction gasses in the flow passage convey a predetermined ratio. The relationship between the pressure losses in either the supply or the exhaust gas manifold and the flow rate of the reaction gases is not disclosed.

No guidance is given in the specification for obtaining the reduction ratio by relating the area of at least one of the supply or the exhaust gas ports to the movement of the movable member as it depends from each fuel cell. The applicant has not set forth the methodology of how the reduction ratio is obtained.

No guidance is given in the specification for obtaining the relationship between the distance between the movable member and at least one of the supply or the exhaust ports that depends on each fuel cell.

Factor (B) The state of the prior art

In the prior art it is known that providing resistance to a flowing fluid at a point A and a point B is a method of establishing a pressure differential between point A and point B of the flow field. Thereby, a pressure differential is established in the flow field. In a fluid device such as the gas flow field of an electrochemical device, a perforated plate, an orifice, or baffle is commonly used to establish a certain pressure differential in a flowing fluid path or to uniformly distribute the flowing medium. The measured pressure drop across the flow distance can be correlated to the flow rate of the flowing fluid. The current application is not aligned with the known method of determining the flow rate of a fluid given the pressure loss experienced by the flowing medium.

Factor (C) The amount of direction provided by the inventor

The applicant's claim of the following is unclear:

a pressure loss control mechanism that controls the pressure in either the supply or the exhaust gas manifold in correspondence to the flow rate of the reaction gases in a way to establish a predetermined ratio between the pressure loss of either manifolds and the pressure loss of the flow passage;

the relationship between or the reduction ratio of the area of at least one of the supply or the exhaust gas ports and the movement of the movable member;

the relationship that between the distance between the movable member and at least one of the supply or the exhaust ports that is set depending of each fuel cell.

The applicant has provided no insight as to how to make and use the claimed invention. The pressure loss in the supply or exhaust manifold is not an indication of the flow rate or pressure loss of the reactant gasses in the flow passages as shown in the prior art. How does the movement of the movable member and the area or change in area of the supply or exhaust port relate to one another via a reduction ratio? The applicant does not provide the proper mechanism or standard by which the stated relationships are established.

Having considered the evidence as a whole, the claims are properly rejected for scope of enablement as set for in MPEP section 2164.04 and 2164.05.

11. Claims 1-16 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1 and 16 recite "...a predetermined ratio..." The Applicant has not provided guidance as to how the ratio is to be determined. Neither Claim 1 nor the specification provides a standard by which the ratio is determined and one skilled in the art would not be reasonably apprised of the scope of the invention.

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12. Claims 6 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 6 and 8 recite "...a reduction ratio..." The Applicant has not provided guidance as to how the reduction ratio is to be determined. Neither Claim 6, Claim 8, nor the specification provides a standard by which the reduction ratio is determined and one skilled in the art would not be reasonably apprised of the scope of the invention.

13. Claim depending on claims rejected under 35 USC § 112, first or second paragraph are also rejected for the same reason.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. As best understood, Claims 1-4, 13, 15, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Ide et al. (Japan 60-032253). Ide et al. discloses an air-supplying device for a fuel cell. The inlet or supply manifold 1 contains rectifier plates 4 that rotate to uniformly distribute air in the direction of the fuel cell stack (see Abstract, Drawing 1). The exhaust manifold contains a clogged condition detector or a pressure sensor or detector (see Abstract). The output of the pressure detector varies according to the amount of resistance to flow encountered by the reactant gasses

between to pressure reference or measuring points in the flow path. Therefore the pressure sensor is inherently a clogged condition detector in that it functions as a in the same manner as the claimed clogged conditioned detector claimed by the applicant. Pooling water or some other entity may produce the resistance. The rotating rectifier plates control the supply of the reaction gases passing through the supply manifold to the flow passages and the exhaust manifold (see Drawing 1). The positioning of the rectifier plates determines the flow area of the manifold supply port (see Drawing 1).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 5-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ide et al. as applied to claim 1 above, and further in view of Sederquist et al. (US 2002/0136677 A1). The disclosure of Ide et al. as discussed above is incorporated herein. Ide et al. does not explicitly teach that the pressure loss control mechanism has through holes. Sederquist teaches a compact multiple tube steam reformer. Sederquist et al. is analogous art because it is in from a similar problem solving area, controlled distribution of fluids through a bank of flow passages. Sederquist et al. teaches a perforated distribution plate in the oxidant manifold (paragraph 52). The perforated distribution plate provides for a uniform pressure drop across the oxidant manifold (paragraph 52). It would have been obvious to one having ordinary skill in the art at the

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time the invention was made to modify the rectifier plates of Ide et al. to include perforations in the plates such as taught by Sederquist et al. in order to establish a more uniform pressure drop across the supply manifold such as taught by Sederquist et al.

18. With respect to claims 6-12, the moveable rectifier plates 4 adjust the area of the supply port as they are turned on their supporting shaft 5 (See Drawing 1). The rotation of the rectifier plates is controlled by coupling the rotating shafts to small control motors with high torque (See Abstract). The input from pressure sensors or detector with the fuel cell is provided to a controller. The controller controls the output of the rotating shafts via input to the driving motor set (See Abstract). Each respective motor is controlled according to the input received from the controller. It would have been obvious to one having ordinary skill in the art at the time the invention was made to control the movement of the each movable member of the pressure control mechanism independently such as taught by Ide et al. due to the variation in flow pattern experienced by each fuel cell.

19. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ide et al. as applied to claim 1 above, and further in view of Komatsu (JP 63-310573 A). The disclosure of Ide et al. as discussed above is incorporated herein. Ide et al. does not explicitly teach a residual hydrogen detector.

20. Komatsu teaches a hydrogen concentration detecting sensor in the manifold on the outlet side of the reactant gas passages that outputs a voltage proportional to the hydrogen concentration passing through the passages and the exit manifold (see Abstract). The voltage output is used to maintain the optimum fuel supply to the fuel

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cell independent of load variation and to alleviate the disadvantages associated with a fuel gas shortage. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the fuel cell of Ide et al. to include a residual hydrogen detector such as taught by Komatsu in order to maintain the optimum fuel supply amount to the fuel cell independent of load variation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shermanda L. Williams whose telephone number is (571) 272-8915. The examiner can normally be reached on Mon.-Thurs. 7 AM - 4:30 PM and alternating Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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